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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/674,242	10/27/2000	Susumu Hizukuri		4962

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EXAMINER	
LEWIS, PATRICK T	
ART UNIT	**PAPER NUMBER**
1623	

DATE MAILED: 08/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/674,242	HIZUKURI ET AL.	
	Examiner	Art Unit	
	Patrick T. Lewis	1623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 May 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4,7,8,10 and 11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4,7,8,10 and 11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 October 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Applicant's Response dated May 27, 2004

1. In the Response filed May 27, 2004, claims 1, 8, and 10 were amended; claim 11 was added. Applicant presented arguments directed to the rejection of claims 1, 2, 4, 7-8, and 10 under 35 U.S.C. 103(a).

2. Claims 1, 2, 4, 7-8, and 10-11 are pending. An action on the merits of claims 1, 2, 4, 7-8, and 10-11 is contained herein below.

3. The rejection of claims 1, 2, 4, 7-8, and 10 under 35 U.S.C § 103(a), is maintained for the reasons of record set forth in the Office Action dated February 25, 2004.

Objections/Rejections of Record Set Forth in Office Action Dated February 25, 2004

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 1, 2, 4, 7, 8, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schiweck et al. U.S. Patent 4,816,078 (Schiweck) in combination with all of the following viewed collectively: Weibel U.S. Patent 4,831,127 (Weibel-1); Weibel U.S. Patent 5,008,254 (Weibel-2); Saha et al. Applied Microbiology and Biotechnology (1996), Vol. 45, pages 301-306 (Saha); and Gatzi et al. *Helv. Chim. Acta.* (**1938**), *21*, 195-205 (Gatzi).

Claims 1, 2, 4, 7, 8, and 10 are drawn to a process for the manufacture of L-arabinose by acid hydrolysis of a vegetable fiber wherein the concentration of the acid is 0.01 to 0.05 N, the temperature is 80-150 °C, and the total amount of saccharides decomposed and eluted during hydrolysis is 30% or more on the basis of the dry substance and the proportion of L-arabinose in the total amount of acid-hydrolyzed monosaccharides is 50% or more.

Schiweck teaches a process for the production of crystalline L-arabinose from araban containing plant material, especially beet araban which was isolated from beet pulp after sugar extraction. The method as taught by Schiweck comprises the mild acid hydrolysis of beet pulp at a temperature of 92 to 97 °C for 70 minutes wherein the sulfuric acid concentration is 0.5 to 2.0% (w/w) (column 2, lines 19-60) as instantly claimed. As any artisan in the field would be aware of, the sulfuric acid concentration when converted to normality is 0.1 N to 0.4 N. L-Arabinose is nearly extracted completely while other carbohydrates such as galactose, rhamnose, and galacturonic acid remain in oligomeric/polymeric forms (column 2, lines 29-32). The solution is then neutralized, filtered to remove any precipitates, and concentrated. The purity of the L-arabinose is 85 to 89% at this point (column 2, lines 38-41). The solution is then concentrated further, cooled to room temperature to crystallize the L-arabinose, and recrystallized from water (column 2, lines 45-60).

Schiweck does not teach the use of a vegetable fiber but rather teaches the use of sugar beet pulp. Schiweck does not disclose the weight percentage of L-arabinose present in the sugar beet fiber. Schiweck also does not disclose the

solid concentration of the sugar beet fiber prior to hydrolysis or the percent composition of the saccharides decomposed during hydrolysis.

Weibel-2 discloses the composition of beet pulp as being largely L-arabinose, D-galactose, and D-galacturonic acid (column 3, lines 21-25) with over 70% of the pectin being L-arabinose and D-galacturonic acid (column 5, lines 42-46). Pectin is the generic term for the dominant polysaccharide (column 3, lines 25-26). Please note that D-galactose and D-galacturonic acid described in Weibel-2 are unnecessary components to attain the object of the present invention, applicant is reminded that the transitional phrase "characterized" is open-ended and, as such, does not exclude the galactose and D-galacturonic acid described in Weibel-2.

Weibel-1 discloses a method for isolating biopolymers from sugar beet pulp. Weibel-1 discloses the beet pulp being made into a slurry of about 4 to 12% total solids and then hydrolyzed under mild acidic conditions wherein the concentration of the acid (HCl) was 0.01 to 0.10 N (column 17, lines 48-57). The pulp material was recovered quantitatively with 50% being in a particulate form and 50% solubilized (column 14, lines 16-19). After hydrolysis and removal of solid particulates, the solution is concentrated containing about 50% arabinogalactan, about 40% pectin, and about 10% other polymers (column 14, lines 28-37). Arabinogalactan and pectin were estimated by the concentration of L-arabinose plus D-galactose and D-galacturonic acid respectively (column 16, lines 34-37).

Saha teaches that L-arabinose is obtainable from corn fiber acid hydrolyzate (page 301, column 2).

Gatzi teaches the catalytic hydrogenation of L-arabinose using Raney Ni and H_2 to produce L-arabitol (English Abstract). The method by which the L-arabinose was produced does not render the instant method for producing L-arabitol unobvious.

It would have been obvious to one of ordinary skill in the art at the time of the invention to manufacture L-arabinose by acid hydrolysis of a vegetable fiber wherein the concentration of the acid is 0.01 to 0.05 N, the temperature is 80-150 °C, and the total amount of saccharides decomposed and eluted during hydrolysis is 30% or more on the basis of the dry substance and the proportion of L-arabinose in the total amount of acid-hydrolyzed monosaccharides is 50% or more as the general methodological steps as claimed are known in the art. The choice of a suitable starting material is seen to be well within the purview of the skilled artisan. One would have been motivated to combine the teachings of the prior art in order to increase the yield of the L-arabinose isolated by the process. The quest for higher yields of L-arabinose is deemed to be sufficient motivation for combining the teachings of the prior art.

6. Applicant's arguments filed May 27, 2004 have been fully considered but they are not persuasive. Applicant argues that the instantly claimed process distinguishes over the cited prior art since Schiweck teaches treatment of the vegetable fiber with $Ca(OH)_2$ (alkaline medium) prior to acidic hydrolysis.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

The examiner acknowledges that Schiweck does indeed teach the extraction of the vegetable fiber with $Ca(OH)_2$ prior to acidic hydrolysis; however, the fact that Schiweck teaches an additional purification step of the vegetable fiber prior to hydrolysis does not render the instantly claimed method unobvious. The examiner disagrees with applicant's assertion that "The prior art consistently teaches the previous use of the alkaline treatment". Wiebel-1 (column 13, line 65 to column 14, line 37) and Wiebel-2 (column 6, line 49 to column 7, line 38) teach the acid hydrolysis of sugar beet pulp without previously contacting the vegetable fiber with an alkaline medium. In view of what the art teaches as a whole, it would have been obvious to one of ordinary skill in the art at the time of the invention to manufacture L-arabinose from L-araban containing plant materials employing acidic hydrolysis of the plant material without previously contacting the material with an alkaline medium.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to

> be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schiweck et al. U.S. Patent 4,816,078 (Schiweck) in combination with all of the following viewed collectively: Weibel U.S. Patent 4,831,127 (Weibel-1); Weibel U.S. Patent 5,008,254 (Weibel-2); and Saha et al. Applied Microbiology and Biotechnology (1996), Vol. 45, pages 301-306 (Saha).

Claim 11 is drawn to a process for the manufacture of L-arabinose by acid hydrolysis of a vegetable fiber selected from envelopes of corn grains, axis of ear of corn, wheat bran, barley bran, oat bran, rye bran, rice bran, defatted rice bran, and apple bran without previously contacting the vegetable fiber with an alkaline medium, wherein the concentration of the acid is 0.01 to 0.05 N, the temperature is 80-150 °C, and the total amount of saccharides decomposed and eluted during hydrolysis is 30% or more on the basis of the dry substance and the proportion of L-arabinose in the total amount of acid-hydrolyzed monosaccharides is 50% or more.

Schiweck teaches a process for the production of crystalline L-arabinose from sugar beet pulp or other L-araban containing plant materials. The method as taught by Schiweck comprises the mild acid hydrolysis of beet pulp at a temperature of 92 to 97 °C for 70 minutes wherein the sulfuric acid concentration is 0.5 to 2.0% (w/w) (column 2, lines 19-60) as instantly claimed. The sulfuric acid concentration when converted to normality is 0.1 N to 0.4 N. L-Arabinose is nearly extracted completely while other carbohydrates such as galactose, rhamnose, and galacturonic acid remain in oligomeric/polymeric forms (column 2, lines 29-32). The solution is then neutralized, filtered to remove any precipitates, and concentrated. The purity of the L-arabinose is 85 to 89% at this point (column 2, lines 38-41). The solution is then concentrated further, cooled to room temperature to crystallize the L-arabinose, and recrystallized from water (column 2, lines 45-60).

Schiweck does not disclose the weight percentage of L-arabinose present in the sugar beet fiber. Schiweck also does not disclose the solid concentration of the sugar beet fiber prior to hydrolysis or the percent composition of the saccharides decomposed during hydrolysis. Schiweck does not teach a method without previously contacting the vegetable fiber with an alkaline medium.

Weibel-2 discloses the composition of beet pulp as being largely L-arabinose, D-galactose, and D-galacturonic acid (column 3, lines 21-25) with over 70% of the pectin being L-arabinose and D-galacturonic acid (column 5, lines 42-46). Pectin is the generic term for the dominant polysaccharide (column 3, lines 25-26). Please note that D-galactose and D-galacturonic acid described in Weibel-2 are unnecessary components to attain the object of the present invention, applicant is reminded that the transitional phrase "characterized" is open-ended and, as such, does not exclude the galactose and D-galacturonic acid described in Weibel-2.

Weibel-1 discloses a method for isolating biopolymers from sugar beet pulp. Weibel-1 discloses the beet pulp being made into a slurry of about 4 to 12% total solids and then hydrolyzed under mild acidic conditions wherein the concentration of the acid (HCl) was 0.01 to 0.10 N (column 17, lines 48-57). The pulp material was recovered quantitatively with 50% being in a particulate form and 50% solubilized (column 14, lines 16-19). After hydrolysis and removal of solid particulates, the solution is concentrated containing about 50% arabinogalactan, about 40% pectin, and about 10% other polymers (column 14, lines 28-37). Arabinogalactan and pectin were estimated by the concentration of

L-arabinose plus D-galactose and D-galacturonic acid respectively (column 16, lines 34-37).

Saha teaches that L-arabinose is obtainable from corn fiber acid hydrolyzate (page 301, column 2).

It would have been obvious to one of ordinary skill in the art at the time of the invention to manufacture L-arabinose by acid hydrolysis of a vegetable fiber wherein the concentration of the acid is 0.01 to 0.05 N, the temperature is 80-150 °C, and the total amount of saccharides decomposed and eluted during hydrolysis is 30% or more on the basis of the dry substance and the proportion of L-arabinose in the total amount of acid-hydrolyzed monosaccharides is 50% or more as the general methodological steps as claimed are known in the art. The choice of a suitable L-araban containing material is seen to be well within the purview of the skilled artisan as the prior art teaches various sources from which arabinose may be extracted. The examiner acknowledges that Schiweck teaches the extraction of the vegetable fiber with $Ca(OH)_2$ prior to acidic hydrolysis; however, the fact that Schiweck teaches an additional purification step of the vegetable fiber does not render the instantly claimed method unobvious. Wiebel-1 and Wiebel-2 teach the acid hydrolysis of sugar beet pulp without previously contacting the vegetable fiber with an alkaline medium. In view of what the art teaches as a whole, it would have been obvious to one of ordinary skill in the art at the time of the invention to manufacture L-arabinose from L-araban containing plant materials employing acidic hydrolysis of the plant material without previously contacting the material with an alkaline medium. One

would have been motivated to combine the teachings of the prior art in order to increase the yield of the L-arabinose isolated by the process. The quest for higher yields of L-arabinose is deemed to be sufficient motivation for combining the teachings of the prior art.

Conclusion

11. Claims 1, 2, 4, 7, 8, and 10-11 are pending. Claims 1, 2, 4, 7, 8, and 10-11 are rejected. No claims are allowed.

Contacts

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick T. Lewis whose telephone number is 571-272-0655. The examiner can normally be reached on M-F 8:00 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James O. Wilson can be reached on 571-272-0661. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-3014 for regular communications and 703-305-3014 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0196.

Patrick T. Lewis, PhD
Examiner
Art Unit 1623

ptl
July 28, 2004